SIEC Briefing Paper Washington State Department of Transportation Application to the Department of Homeland Security for Technology and Processes Enabling Public Safety Interoperability

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Description

The Washington State Department of Transportation (WSDOT) has gone to the SIEC Advisory Work Group and received approval to have this project be forwarded to the SIEC. This project if approved by the Department of Homeland Security would test new technology, legacy equipment, and a new spectrum for this state (700 MHz). This test may become one of the long-term alternatives to promote interoperability within the state.

WSDOT will partner with several private-sector companies using new and innovative technology designed to solved communication interoperability problems commonly encountered by public safety agencies today. These companies include: SmartLink Radio Networks, Inc., Dataradio Corporation; Ascentry Technologies, Inc.; Padcom, Inc.; EF Johnson Co and other vendors. Public sector partners will include the Washington State Patrol, the University of Washington, Washington State University and a variety of other state and local agencies. It is anticipated that this project, if approved will have immediate benefits to Okanogan, Douglas, Kittitas, Grant, Chelan and Yakima counties.

Recommendations to the Committee

This project has been approved by consensus by the SIEC Advisory Working Group. Staff recommends that the SIEC endorse this project.

Status

Due to the timelines for submitting this project, WSDOT has submitted this proposal to the Department of Homeland Security after it was recommended by the SIEC Advisory Work Group.

Issues

- This project would be the first project in this state to use the new 700 MHz spectrum to promote interoperability.
- This project will test the capability of using several technologies together with legacy equipment to aid in interoperability.
- WSDOT has included $500,000 that could be used by the SIEC for planning.
    - It is anticipated by the verbiage in this proposal that these funds would be directed to Washington State University.

Background

The Washington State Patrol (WSP) made a presentation to the SIEC Advisory Work (SAW) Group on October 29 in behalf of the Washington State Department of Transportation (WSDOT). The presentation was asking for the SAW Group to endorse a project that would assist WSDOT and WSP in overcoming problems relating to interference issues and insufficient bandwidth by migrating to a digital 700 MHz system that would follow Project-25 standards.

The problem is that the North Central Region of the state is rural with few urban areas. Several cross-mountain highways, one of which is Interstate-90 connects these rural regions. Although the most of the Interstate has cellular and PCS coverage, most rural highway system have little, if any reliable coverage.

The cities, towns and state agencies serving the citizens have communications problems during minor and major incidents because each operates on a disparate and incompatible radio network.

WSDOT and its partners believe that some technical solutions now exist that will help overcome the state's communications interoperability problems. If approved by the Department of Homeland Security, this project will deploy a 700 MHz infrastructure and a test-bed of 135 mobile units to demonstrate application feasibility of use in mountainous terrain operating through a smart interconnective digital switch. This project will connect part of the 700 MHz infrastructure with the state's fiber optic network and microwave backbone, and deploy appropriate data file servers to manage the distribution of data and control the mountaintop infrastructure.

If this project is successful, it will give the WSDOT additional spectrum for voice and data, it will also give WSP additional bandwidth for data applications. It is also anticipated that all jurisdictions included in this area will be allowed to use this infrastructure for voice and data applications.

Application for

SAFECOM PROGRAM
Technologies and Processes Enabling Public Safety Interoperability

Submitted to
Department of Homeland Security – Direct Reports
Office of Procurement Operations, Office of the Chief Procurement Officer
Washington, DC 20528

In response to Presolicitation Notice Number HSSCHQ-04-RFI-0002
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1. Background

The State of Washington has a statewide analog microwave backbone network, owned by the Washington State Patrol (WSP), that carries emergency and operational communications for state agencies. Generally, this network provides local governments with critical data from national law enforcement agencies and databases for use by 9-1-1 Dispatch Centers and emergency operations. This network is limited by bandwidth capacity issues, which prevents the use of modern, lifesaving technologies and may at times be unavailable to local government. Analog equipment will no longer support the needs of public safety.

The Washington State Department of Transportation (WSDOT) operates the only fully functional statewide coverage 800 MHz Trunked Radio System in the state of Washington, and is experiencing interference with their 800 MHz wireless voice communications system. WSDOT requires a wireless mobile data network. WSP is unable to expand their 450 MHz mobile data system due to lack of existing wireless channels. Both agencies agree the solution to the interference and insufficient wireless data system problems can be overcome by migrating to a digital 700 MHz system that has been established for public agency communications following Project 25 (P-25) standards. P-25 is a standard developed by radio manufacturers, vendors, users, and the federal government that will enable interoperability between different systems and manufacturers. This will result in obtaining maximum radio spectrum efficiency and more effective, efficient, and reliable intra-agency and inter-agency communications.

WSDOT and its partners are working on, or recently completed, several related projects. WSDOT completed a Statewide Communications Plan last year. The purpose of the plan was to provide strategic direction for the management and expansion of WSDOT's communication infrastructure.

A related project, a statewide Wireless Needs Assessment, is a follow-up project currently underway. This project will review WSDOT's existing wireless communications systems and ascertain its ability to meet existing and future communications requirements. It will also look at promising new technologies and recommend a high-level migration path from current conditions to a recommended technology solution.

WSDOT is also partnering with a consortium of public safety agencies on the Olympic Public Safety Communications Alliance Network (OPSCAN) project. The project was recently awarded funding by the U.S. Department of Homeland Security. It will allow local public safety agencies to build a communications backbone, which will enable city, county, state and Federal agencies to talk directly to each other via radio, a facet that currently does not exist in crisis communications on the North Olympic Peninsula of Washington State.

Beginning in early 2004, WSDOT will start a new project called Critical Data Communications System Enhancements (CRITICOM). CRITICOM is a partnership of WSDOT, WSP, the Washington Military Department (WMD) and the Thurston County E-911 Center. The project will enhance the capacity of existing microwave systems, deploy additional microwave infrastructure, and integrate four disparate communications projects. It will also enable each of the agencies to take advantage of new technology that requires additional bandwidth. This technology will assist public safety and incident responders to clear incidents, remotely view traffic flow, assess critical damaged highway infrastructure, move traffic, and evaluate life-threatening situations.

WSDOT and its partners are convinced some technological solutions now exist that will help overcome the state's communications interoperability problems. This paper discusses an interoperable communications problem common in Washington State, and proposes a test of technology recently made available that will allow truly interoperable communications among partner agencies.

2. Problem

The problem is that the North Central Region of the state (indeed the entire central part of the state) is rural with few urban areas. Several cross-mountain highways, one of which is the Interstate 90 (I-90) freeway, connect these rural regions. Together, these highways are used to transport 80 billion dollars of commerce annually. The I-90 freeway transports sixty percent of the west coast shipping containers from seaports to the Midwest section of the United States; additionally I-90 is the main military deployment route from Fort Lewis to the rest of the United States. Although the Interstate has cellular and PCS coverage, and some of the cities and towns in the rural areas have commercial cellular coverage, most of the rural highway system has little reliable coverage.

The cities, towns, and state agencies serving the citizens have communication problems during minor and major incidents because they each operate on disparate and incompatible radio networks. Often, if an emergency response unit (or units) travels outside their own jurisdiction to assist in a major incident or disaster, they do not have the resources to effectively communicate or interoperate with other units at the scene. Various local coalitions have formed to help solve the lack of communications interoperability between emergency responders, but the solutions so far have involved or required an extensive investment in radio equipment with dollars going to equipment that would or could solve the problem.

The state and local highway systems are vital to the nations defense against terrorism, the deployment of military, and the safety of the citizens. The ability to predict storm impacts to the highway infrastructure, as well as real-time icing conditions and timely snow removal efforts, will greatly improve mitigation efforts, improving response times of incident responders. The Federal "Fort to Port Program" is a critical element in support of military deployment.

Lack of mobile data transmission capabilities in the States' rural areas greatly hampers law enforcement and fire protection efforts, and highway maintenance and safety efforts during emergencies. Lack of the ability to interconnect legacy communications systems including satellite, commercial services, and Internet services limit the abilities of first responders and incident commanders to handle the first stages of disasters in a timely manner. This lack of interoperability significantly obstructs effective communications to local hospitals, public works, water districts, school districts, etc.

3. Technical Approach

WSDOT is currently conducting a statewide communications inventory and needs assessment to determine short-term and long-term strategies for wireless interoperability. As part of this effort, WSDOT will develop short-term and a long-term communication system plans based on results of the inventory and assessment, and evaluation of this interoperability pilot project.

The pilot project will deploy 700 MHz digital mobile data infrastructure and a test bed of 135 mobile units to demonstrate application feasibility of use in mountainous terrain operating through a smart interconnective digital switch. The project will interconnect part of the 700 MHz infrastructure with the State's fiber optic network and microwave backbone, and deploy appropriate datafile servers to manage the distribution of data and control the mountain top infrastructure. It will be necessary to augment a portion of WSP's digital microwave backbone for higher bandwidth to adequately handle the new digital backhaul. This augmentation is also required for a portion of WSDOT's digital microwave spurs for the same reasons.

The 700 MHz digital systems with a smart interconnectivity switch will be used to demonstrate interoperability between digital and analog operating communication systems, such as used by the WSP and WSDOT's voice networks. The digital smart switch used in the 700 MHz deployment will also be used to interconnect legacy radio communications systems in use by local, state, and Federal agencies; and provide a pathway for upgrade to P-25 interoperable communications networks.

WSDOT and its partners will initiate and test software offerings to determine the feasibility and operational capabilities of software solutions to interconnect legacy and P-25 capable first responder systems with commercial communications networks. This interconnection will enable the communications system to provide reliable service to local hospitals, public works, water districts, school districts, etc.

WSDOT will deploy base stations operating mutual aid and interoperable frequencies at various mountain top locations and connect them via software solutions and the digital smart switch to provide interoperable communications to first responders when outside coverage range of their home systems.

4. Project Partners

WSDOT will partner with several private-sector companies using new and innovative technology designed to solve communication interoperability problems commonly encountered by public safety agencies today. These companies include: SmartLink Radio Networks, Inc.; Dataradio Corporation; Ascentry Technologies, Inc.; Padcom, Inc.; EF Johnson company and other vendors. Public sector partners include the Washington State Patrol, the University of Washington, Washington State University, and a variety of other state and local agencies.

SmartLink has been supplying radio communication systems to industrial, commercial and governmental entities worldwide since 1991. They provide radio systems technology that enables real-time communications between disparate frequencies and protocols in both trunked and conventional environments. SmartLink has an affordable, straightforward solution to interoperability requirements that allows utilization of existing radios and infrastructure. SmartLink will provide the Advanced Network Processor (ANP, or SmartLink Switch).

DataRadio Corporation, established in 1979, is a leading designer, manufacturer and integrator of private radio data systems. They are suppliers of wireless data solutions for private RF networks, both fixed and mobile. With more than 600 systems installed nationwide and partnered with the best names in mobile data applications technology, DataRadio provides turnkey open-architecture wireless mobile data systems for high availability fleet users in Public Safety, Utilities and Transportation. DataRadio will provide host site, tower site and mobile hardware, as well as an IP wireless gateway. They will also serve as lead technical project managers.

Targeting organizations and agencies engaged in public safety, physical security and transportation, Ascentry Technologies allows a communications system to be setup in minutes--instantly creating a secure, wireless canopy that delivers decisive information. Powered by the FUSION software platform, rapid communications equipment can create an instant, secure information canopy draped over nearly any scenario resulting in a fully mobile broadband communications network. Ascentry's FUSION software: 1) enables disparate organizations to join together at incidents, regardless of geographic isolation; 2) integrates previously disparate and fragmented technologies into a unified rapidly deployable system; 3) provides a way to easily keep the control center at the point of pressure at all times; 4) ensures everyone in the work zone or emergency zone has the actionable information they need, when and where they need it; and 5) enables motorists to get real-time Intelligent Transportation Network information.

Ascentry software enables a unified mobile network platform that integrates fragmented data collection and display technologies. It enables mobile data collection devices to gather and securely transmit almost any type of content to a server (either mobile or fixed). The server then forwards the content to mobile client devices, in an encrypted format. The result is a rapidly deployable and secure wireless local area network (SWLAN). Ascentry will provide the FUSION software suite critical to the proposed interoperable communications system.

Padcom, Inc. makes mobile communication possible by helping organizations overcome the shortcomings of wireless data networks. Padcom software creates a comprehensive wireless data solution that simplifies the underlying complexity of wireless data networks for both end users and IT administrators. Padcom makes it easy to deliver time-critical data to field personnel without employing manual intervention or incurring undue cost. Padcom will provide software for the Dataradio systems.

EF Johnson has made their mark as a leading designer, manufacturer, and marketer of conventional and trunked radio systems, land mobile radio repeaters and mobile and portable radios for local, state, and federal government as well as industrial and commercial applications. For years, EF Johnson has supplied radios to Washington State for use on its microwave radio network. EF Johnson will perform modifications to their existing equipment in support of this project.

The State Interoperability Executive Committee (SIEC) provides state and local agencies and commissions a medium in which to work towards radio interoperability. The SIEC is comprised of representatives of the military department; WSP; WSDOT; the Department of Information Services (DIS); the Department of Natural Resources (DNR); city and county governments; state and local fire chiefs, police chiefs and sheriffs; and state and local emergency management directors. The SIEC develops policies and makes recommendations to the State's Information Services Board for technical standards for state wireless radio communications systems, including emergency communications systems. The standards must address, among other things, the interoperability of systems, taking into account both existing and future systems and technologies. On October 29, 2003 the SIEC Advisory Working Group reviewed and approved this proposed project as being consistent with their mission and goals. The SIEC will serve as project monitors, ensuring consistency with state and federal interoperability requirements.

Among many other activities, the Washington State Patrol (WSP) Communications Division operates a 24-hour-a-day, 365-day-a-year statewide emergency microwave communications system, which includes eight centers in major metropolitan areas of the state. The division provides emergency dispatch services for mobile units of the WSP, Department of Fish and Wildlife, Liquor Control Board, WSDOT, State Parks, and other state and federal agencies. WSP will serve as technical specialists during the upgrading of their microwave radio equipment and as project monitors during the entire project.

The University of Washington's (UW) Washington State Transportation Center (TRAC) provides a link among the government, university researchers, and the private sector. Much of TRAC's research is funded by WSDOT, and TRAC acts as a liaison, connecting those who need applied research at WSDOT with those best suited to conduct it at the universities. From offices at the UW in Seattle and Washington State University in Pullman, researchers at TRAC coordinate resources, serve as a focal point for student involvement in transportation research, and provide services such as report editing, production, and graphics. TRAC will serve as overall lead in the project evaluation.

Washington State University, located in Pullman, Washington, has a graduate communication program referred to as the Edward R. Murrow School of Communication. It also operates the Center to Bridge the Digital Divide, and a Division of Governmental Studies and Services, offering county statewide outreach extension programs to assist in gathering information. As an extension of the WSDOT Wireless Needs Assessment, this group will conduct a statewide inventory and needs assessment for other state agencies and local agencies in support of the SIEC, and develop the short term and long-term plan and strategies for these agencies. They will also develop a statewide interoperability plan for all agencies (state and local), in part, by using the results of this North Central Washington pilot project.

5. Budget

The estimated budget for the entire project is approximately 10 million dollars, including all engineering, design, software, hardware, installation, training and evaluation.

WSP Microwave upgrade — $3.5 million
WSDOT Microwave upgrade — $0.6 million
Data mobile infrastructure — $2.5 million
Inventory and Needs Analysis — $0.2 million
Strategy and Plan Development — $0.3 million
SmartLink Deployment — $1.0 million
Software Pilot Project — $1.0 million
Project evaluation — $0.75 million